CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.06/KRIDL/WMM/Gradation/2014-15

26.05.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, BBMP, Bangalore.

Name of Work : Improvements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.

Reference : EE/BTP/BBMP/KRIDL/WO/ /2013-14

Date of Testing : 26.05.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25065**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	978	978	3.9	96.1	95-100
22.4	6374	7352	29.3	70.7	60-80
11.2	5724	13076	52.2	47.8	40-60
4.75	4215	17291	69.0	31.0	25-40
2.36	3146	20437	81.5	18.5	15-30
0.600	2357	22794	90.9	9.1	8-22
0.075	1986	24780	98.9	1.1	0-8

Note:

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Job No.: CTCE/BBMP/W.No.06/KRIDL/WMM/Gradation/2014-15

26.05.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, BBMP, Bangalore.

Name of Work : Improvements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.

Reference : EE/BTP/BBMP/KRIDL/WO/ /2013-14

Date of Testing : 26.05.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): 25210

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	876	876	3.5	96.5	95-100
22.4	6297	7173	28.5	71.5	60-80
11.2	5478	12651	50.2	49.8	40-60
4.75	4319	16970	67.3	32.7	25-40
2.36	3787	20757	82.3	17.7	15-30
0.600	2314	23071	91.5	8.5	8-22
0.075	1854	24925	98.9	1.1	0-8

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26.05.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, BBMP, Bangalore.
Name of the Work	Improvements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.
Reference	EE/BTP/BBMP/KRIDL/WO/ /2013-14
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	26.05.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Trial No. 3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	379	382	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	79	82	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	297	298	
4	Aggregate Impact value = percent fines	20.90	21.64	21.99	
	100* (W_2/W_1)%				21.51

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (West),** KRIDL, BBMP, Bangalore.
Name of the Work	Improvements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.
Reference	EE/BTP/BBMP/KRIDL/WO/ /2013-14
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	26.05.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Trial No. 3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	385	387	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	84	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	301	301	
4	Aggregate Impact value = percent fines	21.47	21.82	22.22	
	100* (W_2/W_1)%				21.84

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.06/KRIDL/WMM/Shape.T/2014-15 : 26.05.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, BBMP, Bangalore.
Name of Work	: Improvements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/KRIDL/WO/ /2013-14
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Wet Mix Macadam
Date of Testing	: 26.05.2014

Result : Flakiness Index = **12.35%**

Elongation Index = **13.42%**

Result : Combined Flakiness & Elongation index **25.77%**

Comments:

→ Maximum allowable Combined Flakiness & Elongation Index for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.06/KRIDL/WMM/Shape.T/2014-15 : 26.05.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (West),** KRIDL, BBMP, Bangalore.
Name of Work	: Improvements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/KRIDL/WO/ /2013-14
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Wet Mix Macadam
Date of Testing	: 26.05.2014

Result : Flakiness Index = **12.41%**

Elongation Index = **13.18%**

Result : Combined Flakiness & Elongation index **25.59%**

Comments:

→ Maximum allowable Combined Flakiness & Elongation Index for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.06/KRIDL/WMM/AL/2014-15 26.05.2014

ATTERBERG LIMITS TEST FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, BBMP, Bangalore.

Name of Work : Improvements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.

Reference : EE/BTP/BBMP/KRIDL/WO/ /2013-14

Date of Testing : 26.05.2014

Material : WMM

Sample Location : WMM Mix Plant

As per MORTH Table 400-11

Sl. No.	Particulars	Test Results	Standards as per Specifications
1	Liquid Limit, %	23.10	25.0% Maximum.
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No.: CTCE/BBMP/W.No.06/KRIDL/WMM/AL/2014-15 26.05.2014

ATTERBERG LIMITS TEST FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager (West),** KRIDL, BBMP, Bangalore.

Name of Work : Improvements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.

Reference : EE/BTP/BBMP/KRIDL/WO/ /2013-14

Date of Testing : 26.05.2014

Material : WMM

Sample Location : WMM Mix Plant

As per MORTH Table 400-11

Sl. No.	Particulars	Test Results	Standards as per Specifications
1	Liquid Limit, %	22.15	25.0% Maximum.
2	Plasticity Index, %	Non Plastic	6.0% Maximum.

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Job No.: CTCE/BBMP/W.No.06/KRIDL/Bitumen/2014-15

09.06.2014

TEST REPORT

CLIENT	:	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	:	**Technical Manager (West),** KRIDL, BBMP, Bangalore.
NAME OF THE WORK	:	Improvements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.
REFERENCE	:	EE/BTP/BBMP/KRIDL/WO/ /2013-14
SAMPLE ID	:	Bitumen
DATE OF TESTING		09.06.2014

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73-2006
1	Penetration at 25 ^{0}C, 100g, 5 Sec 1/10 mm	IS :1203 -1978 (RA-2009)	64.0	60 to 70
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	56.0	Min. 45
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	> 100	Min. 50
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	265 ^{0}C	Min. 220
5	Fire Point, ^{0}C	IS :1209 -1978 (RA-2009)	305 ^{0}C	-

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Job No.: CTCE/BBMP/W.No.06/KRIDL/SDBC/Bitumen/2014-15 12.06.2014

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 164

CLIENT	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, BBMP, Bangalore.
NAME OF THE WORK	IImprovements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/KRIDL/WO/ /2013-14
SAMPLE I/D	Roads at Anam Enclave, Ward No. 06, Thanisandra.
DATE OF TESTING	12.06.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475.5	476
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	24.5	24.00
7. Bitumen content in %	4.90	4.80
8. Average	4.85	

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Job No.: CTCE/BBMP/W.No.06/KRIDL/SDBC/Gradation/2014-15 12.06.2014

BITUMEN GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, BBMP, Bangalore.
NAME OF THE WORK	IImprovements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/KRIDL/WO/ /2013-14
SAMPLE I/D	Roads at Anam Enclave, Ward No. 06, Thanisandra.
DATE OF TESTING	12.06.2014

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	22.58	4.75	4.75	95.25	90-100
4.75	253.41	53.29	58.04	41.96	35-51
2.36	51.69	10.87	68.91	31.09	24-39
1.18	49.75	10.46	79.38	20.62	15-30
0.3	36.24	7.62	87.00	13.00	9-19
0.075	42.18	8.87	95.87	4.13	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	23.89	5.02	5.02	94.98	90-100
4.75	241.57	50.75	55.77	44.23	35-51
2.36	55.43	11.64	67.41	32.59	24-39
1.18	51.36	10.79	78.20	21.80	15-30
0.3	40.85	8.58	86.79	13.21	9-19
0.075	35.98	7.56	94.34	5.66	3-8

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Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

Job No.: CTCE/BBMP/W.No.06/KRIDL/SDBC/Bitumen/2014-15 13.06.2014

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 164

CLIENT	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, BBMP, Bangalore.
NAME OF THE WORK	IImprovements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/KRIDL/WO/ /2013-14
SAMPLE I/D	Roads at Anam Enclave, Ward No. 06, Thanisandra.
DATE OF TESTING	13.06.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	477	476
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	23	24.00
7. Bitumen content in %	4.60	4.80
8. Average	**4.70**	

Note:

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Job No.: CTCE/BBMP/W.No.06/KRIDL/SDBC/Gradation/2014-15 13.06.2014

BITUMEN GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AASHTO T 30

CLIENT	**Asst. Executive Engineer,** Byatarayanapura Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager (West),** KRIDL, BBMP, Bangalore.
NAME OF THE WORK	IImprovements to roads and drains at Anam Enclave in Ward No. 06, Thanisandra Village Limits, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/KRIDL/WO/ /2013-14
SAMPLE I/D	Roads at Anam Enclave, Ward No. 06, Thanisandra.
DATE OF TESTING	13.06.2014

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	24.53	5.14	5.14	94.86	90-100
4.75	252.18	52.87	58.01	41.99	35-51
2.36	53.34	11.18	69.19	30.81	24-39
1.18	48.67	10.20	79.40	20.60	15-30
0.3	35.29	7.40	86.79	13.21	9-19
0.075	43.15	9.05	95.84	4.16	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	25.68	5.39	5.39	94.61	90-100
4.75	242.96	51.04	56.44	43.56	35-51
2.36	53.87	11.32	67.75	32.25	24-39
1.18	52.16	10.96	78.71	21.29	15-30
0.3	42.32	8.89	87.60	12.40	9-19
0.075	34.75	7.30	94.90	5.10	3-8

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